

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
3. Claims 13, 14, 17, 18, and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nordh (US Patent 4,748,916) further in view of Bechthold et al. (US Patent 3,633,887, hereinafter "Bechthold").

In regards to claim 13, Nordh teaches a nozzle (abstract) with an upper part (2) attached to a lower part (3), with a horizontally extending outlet duct (9) in upper part (2). Outlet duct (9) ends with an opening, and is limited from above by the upper part (2). See Figure 1.

Nordh does not teach a protecting cover attached to the outside of the upper part (2). However, Nordh teaches that the nozzle was designed with a removable upper part (2) because the top of the nozzle is subjected to erosion and corrosion (col.3 lines 11-

16). Therefore, having a separate part will reduce the costs associated with maintenance.

In the analogous art of nozzles for fluidized-bed reactors, Bechthold teaches a nozzle (abstract) with a disk (33) attached to the top of the nozzle that leaves a gap (36) that serves as a cooling passage for body (22a). See Figure 2 and col. 5 lines 52-71.

It would have been obvious for one of ordinary skill in the art to combine the disk and gap of Bechthold with the nozzle of Nordh for the purpose of providing a nozzle with a cooling passage to prevent the buildup of excessive temperatures for the prevention of thermal transformation of the material being distributed by the nozzle.

In regards to claim 14, Bechthold teaches that disk (33) is spaced apart from the body (22a) forming a gap (36).

In regards to claim 17, Bechthold teaches that gap (36) prevents the buildup of excessive temperature in body (22a) and is filled with air (col. 5 lines 69-70). Air is considered an insulator in comparison to metal, which would have a higher thermal conductivity. Therefore, the gap (36) is providing insulation from the heat of the reactor.

In regards to claim 18, Bechthold teaches that the disk (33) is attached by axial stud (34) threaded into bore (35). Furthermore, Bechthold teaches that the distributing head of the nozzle has openings uniformly distributed about the circumference of the assembly (col. 2 lines 32-36). Therefore, Bechthold teaches that the disk (33) is not attached on the blow opening side of the nozzle, as the openings are distributed around the cylindrical nozzle body.

It would have been obvious for one of ordinary skill in the art at the time of the invention to attach a cover plate in the fashion of Bechthold to the nozzle of Nordh for the purpose of providing an entrance to allow fluids to enter the gap and circulate to facilitate cooling.

In regards to claim 23, Bechthold does not specifically teach the compositions of the body (22a) or the disk (33). However, it is implied that all parts are made from the same material because no variations in the composition of the apparatus are taught.

In regards to claim 24, Bechthold teaches that welding is known as a means to attach parts together. See col. 3 lines 40-44, col. 4 lines 50-54, and col. 5 lines 59-65.

Therefore, it would have been obvious for one of ordinary skill in the art at the time of the invention to have welded the disk of Bechthold to the nozzle of Nordh for the purpose of connecting the pieces together.

In regards to claim 25, Nordh teaches that the nozzle could be made from ceramic material (col. 3 lines 29-34). Ceramics are inherently erosion and corrosion resistant, which Nordh teaches erosion and corrosion are risk factors for the upper part (2) of the nozzle (col. 3 lines 17-28). Nordh also teaches that the upper part (2) was made to be easily removable in order to facilitate the ease of replacement after the part has been subjected to erosion and corrosion.

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the disk of Bechthold with the use of ceramics in Nordh for the purpose of making the disk more resistant to erosion and corrosion.

4. Claims 15, 16, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nordh (US Patent 4,748,916) and Bechthold (US Patent 3,633,887) further in view of Zügner (US Patent 4,779,547).

In regards to claim 15, Bechthold teaches a disk (33) that is connected to the body (22a).

Bechthold does not teach that the disk (33) has rigs arranged to the periphery thereof.

In the analogous art of nozzles for fluid bed furnaces, Zügner teaches a nozzle with a wear resistant ring (14) attached to the top and outer edge of the tubular member (11) just above the lid (13). The void formed within the ring is filled with refractory concrete (15) to form a dome. The purpose of the ring (14) and refractory concrete (15) is to provide wear protection of the tubular member (11). See Figure 1 and col. 2 lines 30-43.

It would have been obvious for one of ordinary skill in the art at the time of the invention to combine the nozzle cover of Zügner with the previous combination of Nordh and Bechthold for the purpose of providing a protective covering for the nozzle that is easily attached at the edge of the nozzle body.

In regards to claim 16, Zügner teaches that the ring (14) is mounted on the tubular member (col. 2 lines 39-43). The ring (14) is attached as a way to contain and hold the refractory cement (15) to the lid (col. 1 lines 27-40). Therefore, the wear protecting cover made from the ring (14) and refractory cement (15) is held to the lid (13) by the ring (14).

In regards to claims 19 and 20, Zügner teaches that the ring (14) extends to the side surfaces of the tubular member (11). See Figure 1.

5. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nordh (US Patent 4,748,916) and Bechthold (US Patent 3,633,887) further in view of Capy (US Patent 3,921,913).

In regards to claim 21 and 22, Nordh and Bechthold both do not teach any configuration to the nozzle opening as to form a rising gas flow in front of the opening. However, Nordh provides motivation for a rising gas flow, as Nordh teaches that a nozzle that directs flow downwardly cannot fluidize the bed of a fluidized-bed reactor (col. 1 lines 41-50).

In the analogous art of gas burners, Capy teaches a gas burner with an inclined part (17) in member (11) immediately prior to the lateral wall (14) for the benefit of deflecting the gas flow, and thus the flames, upwards. The inclined part (17) extends around the entire circumference of the burner, as the burner has openings on all sides. See col. 3 lines 13-23 and Figure 4.

Therefore, it would have been obvious to combine the nozzle design of Capy with the previous combination of Nordh and Bechthold for the purpose of fluidizing the bed in the fluidized-bed reactor with an upwards-flowing gas stream.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy Cleveland whose telephone number is

(571)270-5041. The examiner can normally be reached on Monday-Thursday 7:30-5 EST alt Friday 8:30-4 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Angela Ortiz can be reached on (571)272-1206. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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